Impact of critical care physician workforce for intensive care unit physician staffing

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The Society for Critical Care Medicine has advocated for intensivist lead multi-disciplinary critical care for our 30 years; growing evidence supports their assertion. It is estimated that if intensive care unit (ICU) physician staffing (IPS) was implemented in non-rural United States hospitals, 53,000 lives and $5.4 billion would be saved annually. Despite the benefits of hiring physicians specialized in the treatment of critically ill patients, many hospitals worry about their ability to hire critical care physicians to staff their ICUs. In this essay, we discuss issues regarding the future supply of and demand for critical care physicians beginning with an overview of how to evaluate physician supply and demand in general. We then discuss supply and demand for critical care physicians considering emerging issues such as the Leapfrog standard that may impact estimates of the supply and demand for critical care physicians. Curr Opin Crit Care 2001, 7:456–459

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Abbreviations

COMPACCS	Committee on Manpower for Pulmonary and Critical Care Societies
ICU	intensive care unit

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The Society for Critical Care Medicine has advocated for intensivist lead multi-disciplinary critical care for our 30 years; growing evidence supports their assertion [1]. It is estimated that if intensive care unit (ICU) physician staffing (IPS) was implemented in non-rural United States (U.S.) hospitals, 53,000 lives and $5.4 billion would be saved annually [2•,3•]. Nonetheless, there have been few concerted efforts to implement intensivist lead critical care in the U.S. Indeed, it is estimated that from 10 to 15% of ICUs in the U.S. have this staffing model [4•].

Early in 1998, several large U.S. health care purchasers formed the Leapfrog group to initiate breakthroughs in safety and the overall value of health care to U.S. consumers. The Institute of Medicine's report on patient safety "To Err is Human" provided further energy to this group [5]. The Leapfrog group is growing daily and now includes over 30 million employees from over 70 U.S. corporations (see www.leapfroggroup.org). The Leapfrog group sought to create a business case for quality by rewarding high quality care and encouraging employees to use high-quality providers. One of their specifications was to have ICUs staffed by full-time intensivists.

Despite the benefits of hiring physicians specialized in the treatment of critically ill patients, many hospitals worry about their ability to hire critical care physicians to staff their ICUs. There are currently too few board-certified intensivists to meet the IPS standard at all hospitals. If implementing IPS at one hospital may require hiring away intensivists from another hospital, there would be no net savings; savings in direct health care costs at one hospital are cancelled by losses at another. However, the IPS standard may result in more efficient distribution of intensivists such that they had oversight for more patients. While national surveys of the impact of the Leapfrog IPS standard are underway, its full impact on manpower of critical care physicians has yet to be determined.

In this essay, we will discuss issues regarding the future supply of and demand for critical care physicians. While the issues involving the supply of and demand for other ICU providers such as nurses, respiratory therapists and pharmacists are pressing; we will focus only on physicians. We will begin with an overview of how to evaluate physician supply and demand in general, and then discuss supply and demand for critical care physicians considering emerging issues such as the Leapfrog standard

that may impact estimates of the supply and demand for critical care physicians.

Supply and demand for physician services

As health care expenditures have grown, there has been significant interest on modeling future demand for physician services [6,7]. One influential study estimated that there would be a significant over supply of specialist physicians in the year 2000 due to the continued growth of managed care and lower use of specialists [6]. However, managed care has not been shown to decrease the demand for critical care services [8].

The process of estimating future supply of and demand for physician services is complex and requires many assumptions. Estimations of future supply usually begin with the total number of active physicians and subtract the number of retirees, researchers, educators, administrators, residents, and a portion of women physicians. The number of training program graduates is added to this. Estimates of demand begin by determining an appropriate ratio of physicians to patients, using one of three methods: 1) Projecting current demand into the future, given the assumption that the current ratio is correct; 2) Estimating the supply and demand based on clinical judgment; and 3) Estimating the supply and demand based on the expected impact of managed care. Table 1 outlines the way in which the demand for physician services can be estimated under each of the assumptions.

Despite these carefully designed models, the future supply of physicians is often determined by perceptions of demand rather than empiric data and may more closely resemble the behavior of a technology stock price than conforming to rigorous economic models based on rational thought. The recent fluctuation in the supply and demand for anesthesiologists provides an example where perceptions appear to have had a greater impact than the true ratio between supply and demand [9].

Table 1. Three methods for estimating physician demand

Method	Assumptions	Steps
Project current demand	Current demand is appropriate Current demand will remain constant	Begin with current utilization pattern based on age, sex, race Make demographic projections Determine physician productivity
Needs based on clinical judgment	Physicians can predict future need for services	Assemble group of physicians Have group project the incidence of disease, % seen by a physician, % seen by specialist, time spent per patient
Managed care staffing	MCOs have the appropriate number and mix of physicians	Calculate staffing patterns of established MCOs Adjust for differences between MCO and US population in demographics, out-of-plan use, Medicaid and uninsured patients, and physician productivity.

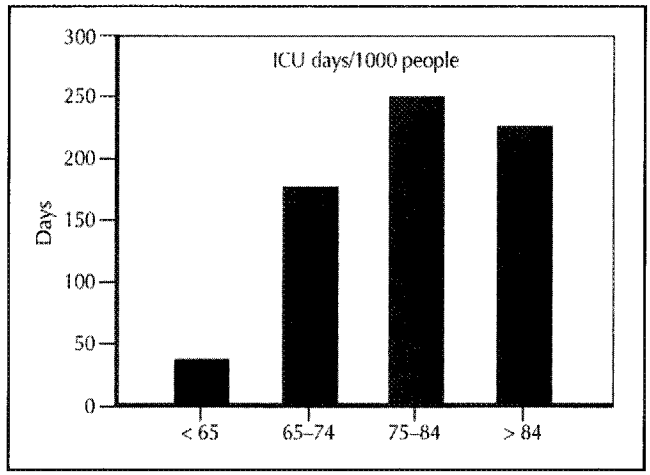
MCO, managed care organization. Reprinted with permission [4•].

Intensivist supply and demand

Three professional societies (American College of Chest Physicians, the American Thoracic Society, and the Society of Critical Care Medicine) recently commissioned an assessment of current and projected demand for critical care services: They formed the Committee on Manpower for Pulmonary and Critical Care Societies (COMPACCS) [4•]. This committee used clinical judgment to evaluate current work patterns for critical care and estimated future supply of and demand for these services up to the year 2030 under alternative scenarios (sensitivity analyses). The models included estimates of U.S. population growth, work hours, practice patterns, and age and disease-specific use of ICUs.

In estimating demand for critical care services, the study found that over half (56%) of all ICU days were consumed by people aged 65 and older (Fig. 1). On the supply side, the study determined that only 10% of ICUs had high intensity ICU physician staffing defined as either a closed ICU or mandatory intensivist consultation. Intensivists provide care for at least one patient in 59% of the ICUs and are more likely to provide care in medical ICUs, in hospitals with over 300 beds, and in hospitals with a large percentage of managed care patients. Physicians trained in pulmonary medicine provide most this care (79%) with internal medicine physicians providing 12%, anesthesiologists providing 6%, and surgeons providing 3%. Overall, 50% of intensivists have a private single practice specialty, 21% have a multispecialty prac-

Figure 1.



The annual number of ICU days per 1000 people used by various age groups in the United States.

tice, 16% have a university affiliated practice, and 9% are employed by a Health Maintenance Organization.

While the supply of intensivists is predicted to remain stable up to year 2030, the COMPACCS study estimates that demand will increase significantly driven largely by the demographics of aging "baby boomers." As a result, supply is expected to fall 22% short of demand by year 2220 and 46% by 2030.

Although these models were carefully constructed, they do not recognize recent efforts by large employer groups that may further increase the demand for critical care services. In an effort to increase patient safety and the value of purchased health care services, the Leapfrog group, an organization that represents Fortune 500 companies, has created three new purchasing specifications for managed care companies with which they contract. Based on evidence that ICU physicians improve patient outcomes, one specification requires that physicians who are trained in critical care medicine and who are exclusively dedicated to the care for ICU patients provide care to all ICU patients [1,10]. Phased implementation will occur over the next several years. Given the aggregate purchasing power of these large consumer groups and their broad geographic distribution, it is likely these specifications will have a significant and widespread impact on the organization and delivery of critical care services over the next decade.

Potential impact of leapfrog ICU physician staffing standard

We have earlier estimated that the Leapfrog safety standard requires a minimum of 1.9 full time equivalent (FTE) physicians for a hospital to implement the IPS standard [3•]. Groeger *et al.* (1993) sent survey questionnaires to 4,233 hospitals and compiled data on more than 32,000 beds in 2,876 ICUs in more than 1,700 hospitals [11]. They found that 63% of ICUs were directed by an internist, and that only 6 hours per day on average were staffed by intensivists; results similar to the COMPACCS study [4•].

There are over 7,400 ICUs registered with the American Hospital Association [12], and there are currently an estimated 5,500 practicing intensivists in the United States[13,14]. Given this, the supply of intensivists would have to be multiplied by approximately 2.6 for all ICUs to be fully staffed according to the Leapfrog IPS standard—prior to taking into account potential growth in ICUs and the likely increases in demand due to demographic and epidemiological shifts described above [4•]. However, the supply of intensivists is predicted to remain stable through the Year 2030. The shortage of intensivists in the years to come could result in pressures to increase salaries for these physicians; increasing the costs of implementing the Leapfrog standard.

Because of the significant shortage of intensivists, strategies to have non-intensivists provide ICU care or to have intensivists provide oversight to a larger number of patients are being sought. There is debate whether hospitalists can fill all or part of the intensivist role. One strategy to extend intensivists oversight would be to create centers of excellence for critical care services. This strategy may be especially appealing in small hospitals areas where due to the small number of ICU patients, the economic benefits of implementing IPS may not offset the costs [3•]. Furthermore, telemedicine is likely to have a profound impact on ICU physician staffing, potentially reducing the need for the direct presence of intensivists in the ICU [15].

In conclusion, intensivists appear to improve the clinical and economic outcomes for patients in ICUs; whether these results are actually achieved may depend on the supply of intensivists. Given the increasing demand for critical care services and the constant supply of intensivists, the shortage of intensivists may become a significant barrier to implementing ICU physician staffing. Further research is needed to develop strategies to increase intensivists manpower such as loan repayment programs, and to evaluate the effectiveness alternative strategies for ICU physician staffing. Given the potential for ICU physician staffing to save 53,000 lives and $5.4 billion annually in the U.S., the supply and demand of intensivists should be given careful consideration.

References and recommended reading

Papers of particular interest, published within the annual period of review, have been highlighted as:

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